# Forest Genetics Council of BC
# Business Plan 2011 / 12

Budgets list only funds provided by the
provincial Land Base Investment Strategy
Tree Improvement Program

**Budgets approved**
**by the Forest Genetics Council of BC on**
**March 16, 2011**

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## Message from the FGC Co-Chairs

We are pleased to present the 11th consecutive annual business plan prepared by the Forest Genetics Council of BC (FGC) and its technical advisory committees. This plan describes activities funded through the Land Base Investment Strategy (LBIS) and supported by various agencies who contribute to FGC's strategic goals and objectives.

As in past years, this 2011/12 Business Plan outlines a balanced set of activities to enhance the conservation, resilience, and value of BC's forest genetic resources. These activities are grouped into subprograms, including select seed production, tree breeding, genecology, genetic conservation, cone and seed pest management, decision support, and extension. LBIS budget allocations and performance indicators are included for most of these subprograms and projects. Species plans, which constitute the bulk of this plan, identify current status and future projections for breeding programs, seed orchards, seed quality, and seed use by seed planning unit.

LBIS funding, plus on-going public and private sector investments in seed orchards and seed management, continue to increase the average genetic quality and total quantity of select seed used for reforestation in BC. As a result, provincial tree improvement activities are responsible for over half of the future timber supply gains expected from incremental silviculture investments, as identified in the Ministry of Forests, Lands and Natural Resource Operations service plan.

Responding to climate change continues to be a priority this year. Research efforts are focused on understanding the patterns of genetic diversity of our commercial tree species, and how to better match seed sources with current and anticipated future climates. Policies that guide operational seed production, registration, and use will also be reviewed in consideration of new scientific information and to support the advancement of professional reliance. An updated forest genetic conservation strategy is also underway. Workforce demographics, restructuring and economic pressures in the private and public sectors, however, continue to present challenges. Council members will work to address these issues where they can, in order to keep us on track with meeting FGC's objectives.

Finally, this plan represents a collaborative effort by many people working in government, the private sector, and universities throughout the province. Cooperation and hard work are the hallmarks of this program and, in large measure, the basis of its success. We would like to thank all the people who contribute to the provincial forest genetics conservation and management program. Your service is greatly appreciated.

Kerry McGourlick, RPF
FGC Co-chair
Western Forest Products Ltd.

Brian Barber, RPF
FGC Co-chair
Ministry of Forests Lands and Natural Resources

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# 1.0 Introduction

*This section overviews the relationship between the multi-stakeholder Forest Genetics Council and its co-operators in the planning and implementation of forest genetic resource management activities in British Columbia, and for the management and allocation of funds under the Land Base Investment Strategy (LBIS) Tree Improvement Program.*

## 1.1 Forest Genetics Council of BC

The Forest Genetics Council of BC (FGC) is a multi-stakeholder group representing the forest industry, Ministry of Forests Lands and Natural Resource Operations (FLNR), universities and the Canadian Forest Service. Council's mandate is to lead a provincial tree improvement and forest genetic resource management (GRM) program that encompasses the conservation, controlled use, and value-enhancement of the genetic resources of forest tree species, and to advise the Provincial Chief Forester on forest genetic resource management policies.

The FGC reports to the Provincial Chief Forester, and provides a forum for stakeholder representatives to set objectives and to oversee the development and delivery of a cooperative Business Plan to fulfill these objectives. The vision statement and objectives set out in the FGC Strategic Plan for the period 2009 to 2014, are:

**Vision statement:**

*BC's forest genetic resources are diverse, resilient, and managed to provide multiple values for the benefit of present and future generations.*

**Objectives:**

1. Adequately conserve the genetic diversity of key populations of all forest tree species native to BC by 2015, through a combination of in situ, ex situ, and inter situ conservation.
2. By 2020, high-quality genecology research information will guide operationally efficient climate-based seed transfer policy and practice for all trees planted in BC.
3. Increase the average volume gain of select seed used for Crown land reforestation to 20% by the year 2020.
4. Increase select seed use to 75% of the provincial total sown by 2014.
5. Coordinate stakeholder activities and secure the resources needed to meet Business Plan priorities.
6. Monitor and report progress in genetic resource management activities.

This Business Plan defines the annual set of activities and budgets needed to achieve these objectives.

## 1.2 A Co-operative Effort

Forest genetic resource management in BC is a co-operative effort. The FLNR leads tree breeding activities, while both private industry and the FLNR manage seed orchards for the operational production of select seed. Genecology research is undertaken by the FLNR and by universities in support of seed transfer policy, climate-change response, and genetic conservation. Industry provides logistical support for field trials and input on the development of priorities. Research in the areas of pest management and other GRM activities is carried out by universities, the FLNR Tree Improvement Branch, and the Canadian Forest Service. Policy development for Crown lands is the responsibility of the FLNR, with advice provided to the Provincial Chief Forester through the FGC.

## 1.3 Land Base Investment Strategy; Tree Improvement Program

The LBIS encourages investment in the forest resource that maximizes productivity and value while supporting forest resilience. The Tree Improvement Program supports specific implementation priorities related to timber supply, fast-growing forests, and adaptation to climate change.

LBIS objectives call for 7.1 million cubic meters of additional annual timber supply provincially in 65 years. Of this, 4.3 million cubic meters are expected to be provided through the LBIS Tree Improvement Program. Investments to meet this objective are made in accordance with program and budget recommendations developed by the FGC through an annual business planning process. FGC objectives are aligned with FLNR objectives, and are set out in the FGC Strategic Plan for 2009 to 2014. The FLNR administers funding through the subprogram areas identified in the FGC Strategic and Business Plans (Figure 1).

Business planning carried out through the existing FGC-led process, includes Technical Advisory Committees (TACs) undertaking specific planning activities, developing budgets, and making operational recommendations (Figure 2). The FGC reviews and makes final recommendations for subprogram budgets and activities, and ensures the overall program meets FLNR and LBIS objectives and administrative requirements. The program is managed and coordinated by the FGC Program Manager on behalf of the FGC, with substantial input from FGC Co-Chairs, Technical Advisory Committee (TAC) Chairs, and others.

In addition to LBIS Tree Improvement Program investments and FLNR direct program investments through staff and in-kind support, private companies also fund activities under Council's Business Plan. The species plans found in Appendix 3 outline general strategy, predict orchard seed production and gain, summarize conservation status, and provide key seed-use and availability statistics for individual species and seed-zone combinations known as seed planning units (SPU).

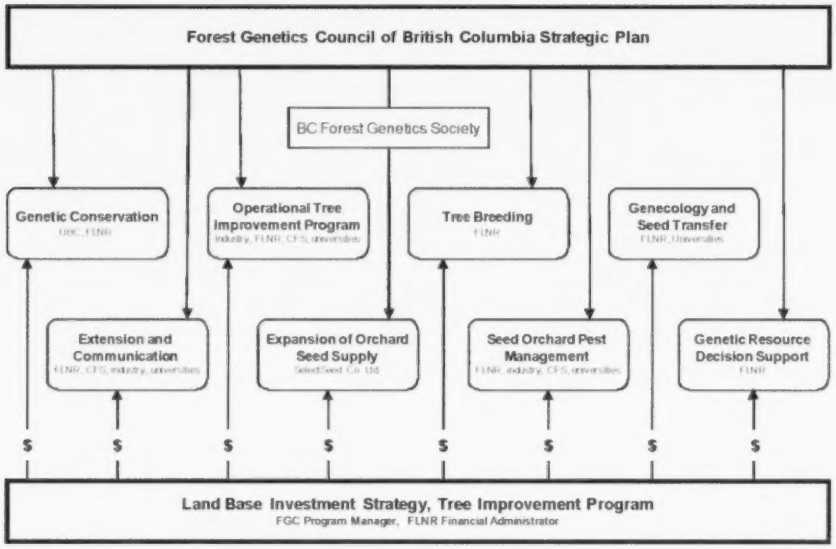

Forest Genetics Council of British Columbia Strategic Plan
BC Forest Genetics Society
Genetic Conservation
Operational Tree Improvement Program
Tree Breeding
Genecology and Seed Transfer
Extension and Communication
Expansion of Orchard Seed Supply
Seed Orchard Pest Management
Genetic Resource Decision Support
$
Land Base Investment Strategy, Tree Improvement Program
FGC Program Manager, FLNR Financial Administrator

**Figure 1** **Relationship between the FGC Strategic Plan, Land Base Investment Strategy Tree Improvement Program, and business plan development through FGC subprograms.**

# 2.0 Process for Business Plan Development

## 2.1 The Role of Council and its TACs

FGC members, representing the FLNR, forest companies, universities, and the Canadian Forest Service, provide strategic direction to the provincial forest genetic resource management program. FGC Technical Advisory Committees provide technical and policy information to Council and contribute to the development of FGC plans and associated budgets. The FGC Business Plan consolidates the subprogram plans and budgets into a comprehensive set of activities that address Council's objectives.

Council's seven TACs lay the groundwork for the FGC Business Plan:

- The Coastal and Interior TACs, through their Species Committees, review and advise on Tree Breeding, Operational Tree Improvement Program (OTIP), and the Expansion of Orchard Seed Supply (SelectSeed Company Ltd.) subprograms.
- The Genetic Conservation TAC (GCTAC) advises Council on issues related to genetic conservation and genetic diversity, and identifies required activities and budgets under the Genetic Conservation Subprogram.
- The Seed Transfer TAC develops strategy and activities for genecology research and climate-based seed transfer policy.
- The Extension TAC (ETAC) is responsible for developing a strategy and annual activity plans for the Extension and Communication Subprogram.

- The Pest Management TAC (PMTAC) identifies information and research needs, and guides both research and extension activities, for the control of insect and disease pests impacting seed orchards and seed production.
- The Genetic Resources Decision Support Steering Committee oversees the development of activities and budgets for the Genetic Resource Decision Support Subprogram.

In addition to the seven advisory committees, Council establishes other committees as needed to advise on shorter-term projects.

Program financial administration is led by the FLNR Tree Improvement Branch. Program management, including business plan and annual report compilation, is led by SelectSeed Company Ltd. (SelectSeed), on behalf of Council.

Council reviews all strategies, plans, or recommendations from its TACs and from SelectSeed for approval (or revision) before incorporating them into the FGC Business Plan. Figure 2 illustrates this hierarchical structure and the link between FGC objectives, planning processes, and the seven subprograms through which it is implemented. The process by which the Council Subcommittees or other agencies define activities and budgets for each subprogram is discussed in Section 3. Subprogram leaders are authorized to reallocate funds within their subprograms as necessary throughout the fiscal year, subject to limits and review process.

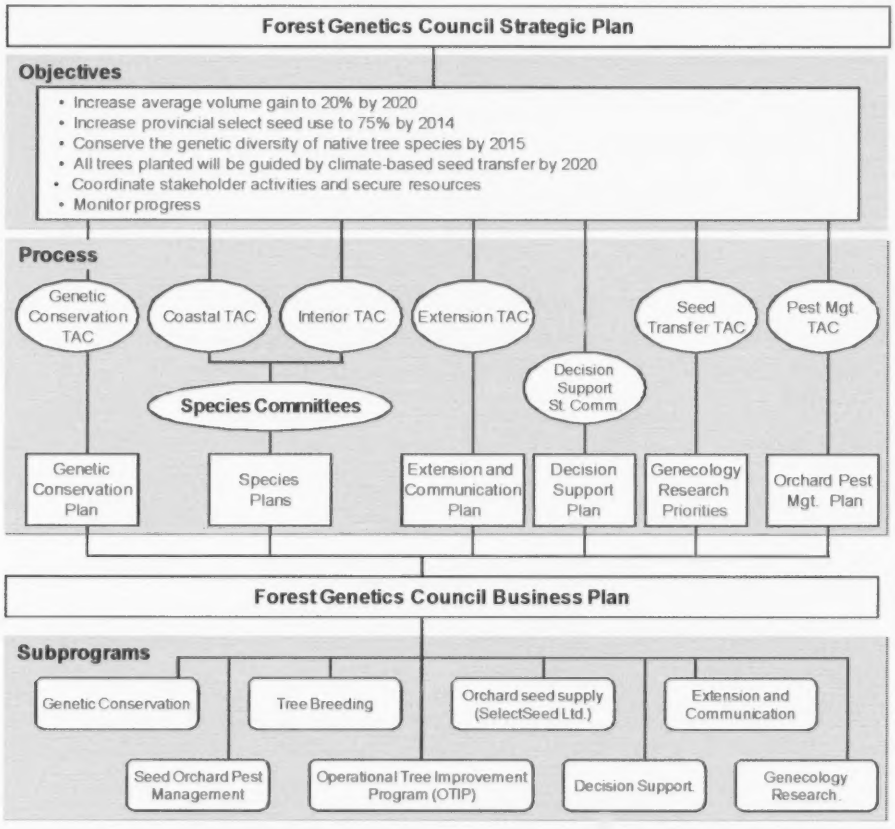

Forest Genetics Council Strategic Plan
Objectives
• Increase average volume gain to 20% by 2020
• Increase provincial select seed use to 75% by 2014
• Conserve the genetic diversity of native tree species by 2015
• All trees planted will be guided by climate-based seed transfer by 2020
• Coordinate stakeholder activities and secure resources
• Monitor progress
Process
Genetic Conservation TAC
Coastal TAC
Interior TAC
Extension TAC
Seed Transfer TAC
Pest Mgt TAC
Species Committees
Decision Support St. Comm
Genetic Conservation Plan
Species Plans
Extension and Communication Plan
Decision Support Plan
Genecology Research Priorities
Orchard Pest Mgt. Plan
Forest Genetics Council Business Plan
Subprograms
Genetic Conservation
Tree Breeding
Orchard seed supply (SelectSeed Ltd.)
Extension and Communication
Seed Orchard Pest Management
Operational Tree Improvement Program (OTIP)
Decision Support
Genecology Research

**Figure 2 Link between FGC objectives, planning processes, and the subprograms of the FGC Business Plan**

# 3.0 Subprogram Planning and Management

## 3.1 Genetic Conservation Subprogram

Genetic conservation activities monitor and catalogue genetic resources for indigenous tree species, research conservation methods and needs, provide background genecology information for non-commercial species, and provide guidance to the FGC and the FLNR on policy development.

### 3.1.1 Planning

Genetic conservation activities are developed through the FGC Genetic Conservation TAC (GCTAC), with programs and spending approved by the FGC.

### 3.1.2 Management

Subprogram delivery is primarily shared by the Centre for Forest Conservation Genetics at the University of BC (CFCG) and the Tree Improvement Branch of the FLNR. The Provincial Tree Seed Center (Tree Improvement Branch) provide ex situ seed inventory and collection planning. The GCTAC sets broad objectives and provides budget recommendations to the FGC.

The CFCG receives funding through a Transfer Agreement with the FLNR under the LBIS Tree Improvement Program. In addition, the Centre collaborates with other groups and agencies, and seeks funding from other sources as opportunities arise. Significant adjustments in technical objectives or budgets for projects funded through the LBIS must be approved by the GCTAC.

### 3.1.3 Activities and Budget

The Centre for Forest Conservation Genetics will help identify specific *in situ* and *ex situ* conservation needs and strategies, and will assist with forest certification and climate change issues as they relate to genetic conservation and management. Investments through the CFCG also allow leveraging of funds with other provincial, national, and international agencies in the area of conservation genetics. Centre staff continue to develop and manage the ClimateBC model that is now widely used for understanding climate-change impacts in forest ecosystems.

In the 2011/12 fiscal year, the Centre will receive $113,000 for projects listed in Table 1. In addition, the Centre will continue to provide expertise on climate change impacts, seed-transfer options, and ongoing planning and policy developments related to climate change. The ClimateBC model, which is extensively used for non-genetics applications, will continue to be developed and managed with support from this budget as well as an a research grant from another agency.

A budget of $92,000 is allocated to the Tree Improvement Branch for projects listed in Table 1, including testing of the *ex-situ* conservation seedlot collections held at the Provincial Tree Seed Centre.

**Table 1** **Conservation subprogram budget for 2011/12.** Only activities funded by the Land Base Investment Strategy account are shown here.

| Project | Budget | Products |
|---|---|---|
| **UBC Center for Forest Conservation Genetics** | | |
| **Projects leveraged with the ADAPTREE Genome Canada grant** | | |
| Climate Modelling | $ 55,000 | 1 report |
| Seed Orchard –Adaptive Diversity | $ 16,630 | 1 report |
| Computing / web updates | $ 7,000 | 1 report |
| Climate change and genetic conservation | $ 2,000 | 1 report |
| Non-commercial species | $ 6,000 | 1 report |
| Interior spruce | $ 10,000 | 1 report |
| **General CFCG expenses** | $ 8,000 | |
| Subtotal | $ 104,630 | |
| 8% UBC overhead | $ 8,370 | |
| **Total for the Centre for Forest Conservation Genetics** | **$ 113,000** | |
| **FLNR Tree Improvement Branch** | | |
| ***Ex situ* conservation** | | |
| Seed procurement for priority species, including relevant documentation | $ 29,500 | 1 report |
| Seed processing to spec for TSC storage | $ 8,000 | 1 report |
| ***In situ* conservation** | | |
| Population genetic analyses of model species to develop conservation guidelines for minor species lacking genetic data | $ 43,000 | 1 report |
| Report summarizing results of catalogue field verification | $ 500 | 1 report |
| ***inter situ* conservation** | | |
| Technical report summarizing status of MFLNR genecology programs for 10 non-commercial tree species | $ 3,500 | |
| **Meetings, travel, etc.** | $ 2,500 | |
| **Provincial Tree Seed Center** | | |
| Testing of conservation seed collection | $ 5,000 | |
| **Total for FLNR Tree Improvement Branch** | $ 92,000 | |
| **TOTAL BUDGET** | **$ 205,000** | |

## 3.2 Tree Breeding Subprogram

The Tree Breeding Subprogram focuses on the continued development of parent trees selected for traits that will enhance timber supply and stand resilience. Selected parent trees are used for the production of seed and vegetative material. Tree breeding activities include selecting parents in wild stands, propagation, field-testing offspring, mating, establishing/maintaining/measuring trials, and support research. For most provincial programs, selection from wild stands is largely complete. Breeding strategy and level of advancement vary, but all breeding programs are well into field testing and selection at either the first or second generation. This Subprogram also includes realized-gain trials that quantify area-based gains in timber production, and support research on pests and other issues that impact the achievement of genetic gains in timber supply and quality. Some genecology research associated with progeny tests is also carried out. The tree breeding subprogram is implemented by the FLNR Tree Improvement Branch.

### 3.2.1 Planning

Priorities for breeding activities are set among seed planning units using value traits (mean annual increment, level of planting), expected future impact under climate change, and logistical considerations such as ease (cost) of operating breeding and seed orchard activities. Breeding, genecology, and genetics research strategies developed by FLNR tree breeders were reviewed by FGC Interior and Coastal TACs, and direction was given to ensure alignment with FGC strategic objectives and with ongoing operational needs and programs.

Tree Breeding Subprogram budgets were developed at the SPU level by the RLNR breeder responsible, and reviewed by TAC members. These budgets were then adjusted by the Manager, Forest Genetics, FLNR Tree Improvement Branch, with input from the FGC Program Manager, to find efficiencies and to meet the total expected Subprogram budget allocation. A budget recommendation was reviewed by the FGC on March 16, 2011 and adjusted as necessary to meet the overall budget allocation.

### 3.2.2 Management

The FLNR manages Tree Breeding Subprogram activities, with progress reported to cooperators through the FGC. The Manager of Forest Genetics, FLNR Tree Improvement Branch, has authority for project re-allocations in support of FGC objectives. Substantial re-allocations between seed planning units or from breeding activities to technical support activities require the agreement of the Director, Tree Improvement Branch and the FGC Program Manager.

### 3.2.3 Activities and Budget

The 2011/12 budget for the Tree Breeding Subprogram is $1.156 million, including support for clonebank maintenance at the Cowichan Lake Research Station. Table 2 summarizes budgets and key performance indicators (KPI) for breeding activities by SPU and activity.

## 3.3 Operational Tree Improvement Program (OTIP)

The OTIP subprogram supports FGC objectives to increase the quality and quantity of select seed produced from existing private and FLNR seed orchards. It also provides technical support for orchard production and management.

### 3.3.1 Planning

OTIP investment is based on input from the Interior and Coastal TACs (see Appendix 3) and on species plans that outline seed production strategies within each SPU. Based on these strategies, and on priority lists approved by the TACs, a formal call for proposals is issued.

FGC committees review and rank all proposals against FGC objectives and SPU priorities, based on technical merit, impact, value, and cost. OTIP projects are selected to increase the genetic gain in seed made available for reforestation and to increase the quantity of seed produced from existing orchards. They support FGC short-term objectives for gains in the growth rate, pest resistance, and wood quality of reforestation materials. They also support FGC long-term objectives through the replacement of trees in existing seed orchards with trees of higher genetic value. The total budget allocation for OTIP is recommended by the FGC to the provincial Chief Forester and LBIS administrators in the FLNR.

### 3.3.2 Management

The FLNR Tree Improvement Branch administers OTIP in accordance with recommendations from the FGC. Requests for re-allocations or for new funding are handled by the FLNR Tree Improvement Manager of Business Operations in consultation with the appropriate TAC and the FGC Program Manager. All projects report on key performance indicators to enable tracking of planned activities.

### 3.3.3 Activities and Budget

The 2011/12 OTIP budget is $765,000, with allocations of $116,000 to coastal orchards and $649,000 to interior orchards. Table 3 outlines approved OTIP budgets and performance indicators for all seed planning units.

## 3.4 Expansion of Orchard Seed Supply Subprogram (SelectSeed Co. Ltd.)

This subprogram was established in 1999 to address a need for seed orchard capital investment to meet FGC objectives. For seed planning units (SPU) with insufficient orchard capacity, as determined by the ITAC and CTAC at the time, orchard-development investments were initiated through SelectSeed Company Ltd. using competitive bids and long-term contracts.

SelectSeed is wholly owned by the Forest Genetics Council through the B.C. Forest Genetics Society. All Society members are on Council. The SelectSeed Board of Directors is elected by Society members (Figure 3). SelectSeed's mission is to "support Forest Genetics Council objectives for the development of seed orchard facilities to meet the provincial demand for high quality, genetically adapted tree seed through investments, cooperative work with FGC members and effective program management."

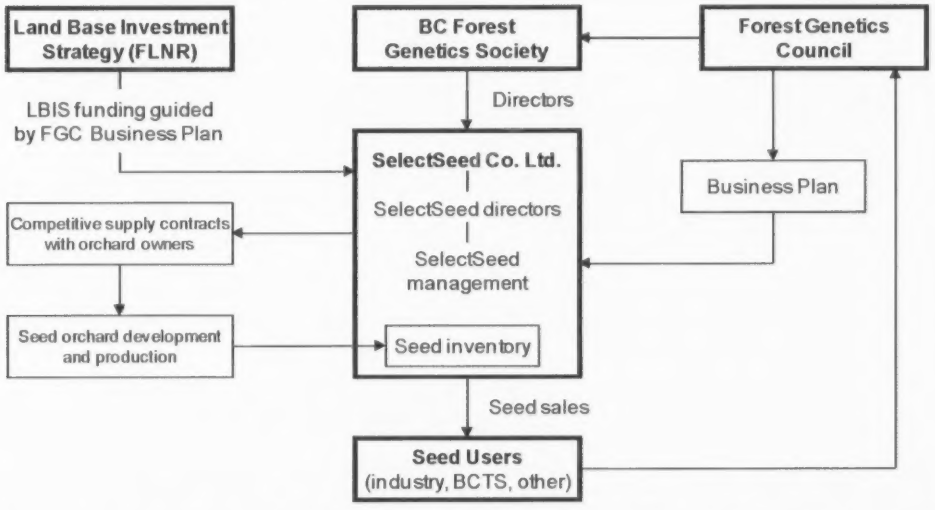



**Figure 3** **Organizational relationships among SelectSeed Ltd., Land Base Investment Strategy, Forest Genetics Council, and the B.C. Forest Genetics Society**

### 3.4.1 Planning

SelectSeed's Business Plan and investments are based on the long-term and annual business plans prepared by the FGC and its associated committees. Species plans (Appendix 3) contain analyses of projected orchard expansion needs that guide SelectSeed investments. Specific technical advice is sought as required from Species Committees or others.

### 3.4.2 Management

Management discretion for spending lies with the SelectSeed Board of Directors, and is limited by the terms of the SelectSeed Multi-Year Agreement with the FLNR. Investments in new orchards will be approved by the FGC and follow FGC and TAC guidance, with emphasis on both the technical quality of developments and on cost. SelectSeed's annual business plan was approved by the Forest Genetics Council on March 16, 2011.

### 3.4.3 Activities and Budget

In 2011/12, SelectSeed will continue to focus on the management of 11 long-term orchard agreements covering the operation of 14 orchards (Table 5). No new orchard agreements are anticipated during the year.

Seed orchard management and development activities for the fiscal year include planting 450 ramets in three orchards, and propagating and holding 600 ramets. A total of 35,147 ramets are planned across all 14 orchards. The total number of established ramets is approximately 34,600, with ongoing mortality due to pests and other causes removing approximately 150 ramets per year. All grafting and holding work is done through contracts. Seed production for 2012 is forecast at 42 kilograms of lodgepole pine, 25 kilograms of Douglas-fir, and 10 kilograms of spruce. Expected gross revenue from seed sales are forecast at $451,000.

Other activities will include program management on behalf of the Forest Genetics Council, including Business Plan and budget development, committee support, managing program development and subprogram interactions, and preparation of mid-term and annual reports.

**Table 2** **2011/12 budgets ($ x 1000) and KPI by seed planning unit for tree breeding and associated technical support activities. See Species Plans (Appendix 3) for more detail on seed planning units.**

| Seed Planning Unit | | | | *220 Selection and Breeding* | | | | | | *230 Progeny testing* | | | | | | | | | | *240 Technical Support* | | | | | | | | Total $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 211 | | 221 | | 222 | | 223 | | 231 | | 232 | | 233 | | 234 | | 235 | | 240-1 | | 240-2 | | 240-3 | | 240-4 | | |
| | | | | # genotypes selected | | # genotypes establ. in arboreta / | | # genotypes maint. in breeding | | # crosses made | | # test sites sown | | # progeny sites establ. / prepped | | # progeny test sites maintained | | # of progeny sites assessed | | # of test sites analyzed | | Projects | | | | | | | | |
| # | Spp. | SPZ | Elev (m) | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | x 1000 |
| 1 | Fdc | M | 1-700 | 20 | 6 | 150 | 2 | 100 | 2 | 10 | 2 | 2 | 2 | 3 | | 12 | 36 | 6 | 20 | 4 | 25 | | | | | | | | | 95 |
| 2 | Cw | M | 1-600 | | | 100 | 3 | 450 | 2 | 200 | 10 | 3 | 10 | 3 | 20 | 12 | 35 | 8 | 40 | | | 1 | 12 | | | | | | | 132 |
| 3 | Hw | M-S | 1-600 | 25 | 1 | 125 | 1 | 150 | 1 | | | | | | | 6 | 36 | | | 9 | 1 | 5 | 7 | | | | | | | 47 |
| 4 | Sx | NE | 1000-1500 | | | | | | | 100 | 5 | | | | | | | | | | | | | | | | | | | 5 |
| 5 | Sx | NE | 1500-1900 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 6 | Ss | M | 1-500 | 200 | 2 | | | | | | | | | | | 12 | 18 | 3 | 18 | | | 1 | 10 | 1 | 12 | | | | | 60 |
| 7 | Pli | NE | 700-1400 | | | | | 150 | 10 | | | | | | | 8 | 23 | 1 | 4 | | | | | | | | | | | 37 |
| 8 | Pwc | M/SM | 1-1400 | 200 | 9 | | | | | 100 | 12 | 3 | 3 | | | | | 15 | 33 | 3 | 15 | | | | | | | | | 72 |
| 9 | Ba | M | 1-1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 10 | Pli | TO | 700-1400 | 40 | 16 | | | | | | | | | | | | | 1 | 4 | | | | | | | | | | | 20 |
| 11 | Yc | M | 1-1100 | | | 100 | 2 | 300 | 3 | | | | | 2 | 10 | 9 | 45 | | | | | | | | | | | | | 60 |
| 12 | Pli | PG | 700-1200 | 100 | 28 | | | | | | | | | | | 3 | 10 | 3 | 11 | | | | | | | | | | | 49 |
| 13 | Lw | NE | 700-1400 | | | | | 2,000 | 20 | 100 | 5 | | | | | | | | | | | | | | | | | | | 25 |
| 14 | Sx | PG | 600-1200 | | | | | | | | | | | | | 4 | 11 | 5 | 32 | | | 4 | 23 | 5 | 25 | 60 | 5 | 1 | 8 | 104 |
| 15 | Pw | KQ | 500-1400 | | | | | 40 | 5 | | | | | | | 3 | 10 | 3 | 7 | | | | | | | | | | | 22 |
| 16 | Pli | TO | 1400-1600 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 17 | Pli | BV | 700-1200 | | | | | | | | | | | | | | | 8 | 4 | | | | | | | | | | | 4 |
| 18 | Pli | CP | 700-1100 | | | | | | | | | | | | | | | 1 | 12 | | | | | | | | | | | 12 |
| 19 | Fdc | SM | 400-1200 | | | | | | | | | | | | | | | | 18 | | | | | | | | | | | 18 |
| 20 | Pli | NE | 1400-2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 21 | Fdi | NE | 400-1000 | | | | | | | 100 | 5 | | | | | 4 | 12 | 4 | 18 | | | 1 | 2 | | | | | | | 37 |
| 22 | Fdi | NE | 1000-1600 | | | | | | | 100 | 5 | | | | | | | | | | | | | | | | | | | 5 |
| 23 | Sx/Ss | SM/NST | all | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 24 | Hw | M | 600-1100 | | | | | | | | | | | | | 4 | 20 | | | | | | | | | | | | | 20 |
| 25 | Sx | EK | 750-1700 | | | 2,000 | 10 | | | | | | | | | | | | | | | | | | | | | | | 10 |
| 26 | Pli | PG | 1200-2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 27 | Cw | SM | 200-1000 | | | | | | | | | | | | | 2 | 5 | 2 | 6 | | | | | | | | | | | 11 |
| 28 | Sx | TO | 1300-1900 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 29 | Pli | EK | 1500-2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 30 | Sx | TO | 700-1300 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 31 | Fdc | M | 700-1200 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 32 | Pli | EK | 800-1500 | | | | | | | | | | | | | 2 | 4 | 2 | 15 | | | | | | | | | | | 19 |
| 33 | Cw | SM | 600-1500 | | | | | | | | | | | | | 2 | 5 | 2 | 6 | | | | | | | | | | | 11 |
| 34 | Lw | EK | 800-1500 | | | | | | | 100 | 5 | | | | | | | | | | | | | | | | | | | 5 |
| 35 | Sx | BV | 500-1200 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 36 | Bg | M | 1-700 | 18 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 37 | Fdi | QL | 700-1200 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 39 | Fdi | EK | 700-1400 | | | | | | | | | | | | | 4 | 8 | 4 | 20 | | | | | | | | | | | 28 |
| 40 | Sx | PR | 650-1200 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 41 | Fdi | PG | 700-1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 42 | Sx | PG | 1200-1550 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 43 | Fdi | CT | 600-1200 | | | | | | | | | | | | | 3 | 6 | 3 | 15 | | | | | | | | | | | 21 |
| 44 | Sx | NE | 1-1000 | | | | | | | 35 | 2 | | | | | | | | | | | | | | | | | | | 2 |
| 45 | Pli | BB/CHL | all | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 46 | Bl | all int. | all | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 47 | Bn | M | all | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 48 | At/Ep/Ct | interior | all | | | 10 | 1 | 50 | 6 | | | | | | | | | | | | | | | | | | | | | 7 |
| 49 | Dr/Ct/Mb | Coast | all | | | | | 145 | 7 | 25 | 2 | | | | | 2 | 5 | 2 | 10 | | | 1 | 10 | | | | | | | 34 |
| 50 | Lw | NE | 1200-1800 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 51 | Yp | S.Int. | 300-1200 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Clonebank maintenance and upgrades at the Cowichan Lake Research Station | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 25 |
| | To be allocated | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 160 |
| | **Totals** | | | 603 | 62 | 2,485 | 19 | 3,395 | 56 | 870 | 53 | 8 | 15 | 8 | 30 | 92 | 289 | 73 | 293 | | | 13 | 64 | 6 | 37 | 60 | 5 | 1 | 8 | 1,156 |

**Table 3 2011/12 budgets ($ x 1000) and KPI by seed planning unit for OTIP projects. See species plans (Appendix 3) for SPU detail.**

| Seed Planning Unit | | | | *320 Quality / Quantity Boosts* | | | | | | | | | | | | | | *340 Pest Management* | | | | | | *350 Tech Support* | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 321 Grafting (# grafts) | | 322 Hold grafts (# ramets) | | 323 Replacement (# ramets) | | 324 Rogueing (# rogued) | | 325 SMP/CP (# ramets) | | 326 Induction (# ramets) | | 327 Orch mgt. (# ramets) | | 331 Cutting donors (# cuttings) | | 341 Insect control (# ramets) | | 342 Disease control (# ramets) | | 343 Monitoring (# ramets) | | # of reports | | $x1000 |
| # | Spp | SPZ | Elev (m) | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | $ |
| 1 | Fdc | M | 1-900 | 1 | 3 | 1247 | 4 | 429 | 3 | 220 | 1 | 919 | 4 | 945 | 1 | 8471 | 16 | | | 4694 | 4 | 5213 | 1 | | | 1 | 8 | 44.8 |
| 2 | Cw | M | 1-700 | 60 | 0 | 609 | 1 | 30 | 0 | | | 352 | 5 | 188 | 0 | 592 | 3 | | | 780 | 2 | | | 240 | 0 | 1 | 5 | 17.2 |
| 3 | Hw | M | 1-600 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 4 | Sx | NE | 1000-1700 | | | 103 | 0 | 89 | 1 | 400 | 12 | | | | | 279 | 1 | | | 2118 | 7 | 2118 | 1 | 2050 | 1 | 1 | 14 | 37.3 |
| 5 | Sx | NE | 1700-2100 | | | 8 | 0 | 73 | 1 | 350 | 10 | | | | | 252 | 1 | | | 1941 | 6 | 1941 | 1 | 1941 | 1 | | | 20.0 |
| 6 | Ss | M | 1-500 | | | | | | | 100 | 1 | | | | | 551 | 2 | | | 551 | 2 | | | | | | | 4.2 |
| 7 | Pli | NE | 700-1600 | | | 208 | 1 | 35 | 0 | 20 | 0 | 3493 | 5 | | | 1681 | 3 | | | 25299 | 38 | 4772 | 2 | 14666 | 9 | 2 | 27 | 85.7 |
| 8 | Pw | M/SM | 1-1000 | 120 | 1 | | | | | | | | | | | 652 | 3 | | | | | | | | | | | 3.8 |
| 9 | Ba | M | 1-1000 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 10 | Pli | TO | 700-1400 | | | | | 50 | 0 | 50 | 1 | 6442 | 4 | | | 753 | 2 | | | 9106 | 6 | 4906 | 1 | 9106 | 5 | 2 | 1 | 20.6 |
| 11 | Yc | M | 1-1100 | | | | | | | | | | | | | 4717 | 3 | 16440 | 11 | 5837 | 0 | | | | | 2 | 17 | 31.2 |
| 12 | Pli | PG | 700-1400 | 1500 | 14 | 2000 | 4 | 1688 | 20 | 80 | 0 | 14648 | 14 | | | 696 | 3 | | | 30828 | 51 | 5453 | 2 | 20725 | 7 | | | 115.9 |
| 13 | Lw | NE | 700-1600 | | | | | | | | | | | | | 462 | 1 | | | 1847 | 2 | 1847 | 1 | 1847 | 1 | | | 3.7 |
| 14 | Sx | PG | 600-1400 | | | | | | | 1000 | 21 | | | | | | | | | 2079 | 1 | | | 2079 | 1 | 1 | 8 | 31.6 |
| 15 | Pw | KQ | 500-1400 | 200 | 2 | 159 | 1 | 34 | 1 | | | 1870 | 3 | | | 496 | 1 | | | 5895 | 21 | 3130 | 1 | 5114 | 4 | | | 33.1 |
| 16 | Pli | TO | 1400-1600 | | | | | | | 396 | 10 | 3504 | 3 | | | 1 | 0 | | | 11801 | 32 | | | 12564 | 7 | | | 52.1 |
| 17 | Pli | BV | 700-1400 | 2200 | 21 | 4000 | 6 | 1257 | 17 | 50 | 0 | 12563 | 17 | 200 | 1 | 1062 | 2 | | | 21134 | 25 | 2532 | 1 | 29400 | 13 | 1 | 1 | 103.9 |
| 18 | Pli | CP | 700-1300 | | | | | | | 30 | 0 | 13882 | 15 | 150 | 0 | 650 | 2 | | | 13536 | 11 | 830 | 0 | 12888 | 6 | | | 34.1 |
| 19 | Fdc | SM | 200-1000 | 200 | 2 | 159 | 1 | | | | | 743 | 1 | | | 584 | 3 | | | 743 | 0 | | | | | | | 7.4 |
| 20 | Pli | NE | 1600-2000 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 21 | Fdi | NE | 400-1200 | | | | | | | | | 1200 | 2 | 1700 | 3 | 729 | 1 | | | 2187 | 8 | 2187 | 1 | 1200 | 1 | | | 16.1 |
| 22 | Fdi | NE | 1000-1800 | | | | | | | | | 1420 | 3 | 473 | 1 | 811 | 2 | | | 3243 | 13 | 3243 | 1 | 2000 | 1 | | | 21.4 |
| 23 | Sx/Ss | SM/NST | all | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 24 | Hw | M | 600-1100 | | | | | | | | | | | | | 455 | 3 | | | 520 | 0 | | | | | | | 3.3 |
| 25 | Sx | EK | 750-1900 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 26 | Pli | PG | 1400-2000 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 27 | Cw | SM | 200-1000 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 28 | Sx | TO | 1300-2100 | | | | | | | | | | | 1000 | 3 | 1508 | 0 | | | 1508 | 1 | 1508 | 0 | 1508 | 1 | | | 5.9 |
| 29 | Pli | EK | 1500-2000 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 30 | Sx | TO | 700-1500 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 31 | Fdc | M | 900-1200 | 40 | 0 | 35 | 0 | 35 | 0 | | | | | | | 247 | 1 | | | 282 | 0 | | | | | | | 2.1 |
| 32 | Pli | EK | 800-1500 | | | | | | | | | 1623 | 3 | | | 606 | 1 | | | 2935 | 5 | 2423 | 1 | 2512 | 2 | | | 12.4 |
| 33 | Cw | M | 700-1500 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 34 | Lw | EK | 800-1700 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 35 | Sx | BV | 500-1400 | 100 | 1 | 121 | 0 | 132 | 1 | 200 | 6 | 524 | 2 | 175 | 1 | 178 | 0 | | | 3246 | 4 | 3246 | 1 | 3246 | 1 | | | 17.7 |
| 36 | Bg | M | 1-700 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 37 | Fdi | QL | 700-1400 | | | | | | | | | 4 | 3 | 538 | 2 | | | | | 1185 | 1 | | | | | | | 5.6 |
| 39 | Fdi | EK | 700-1400 | | | | | | | | | 1 | 1 | | | 278 | 1 | | | 1112 | 3 | 1112 | 0 | 1112 | 1 | | | 5.7 |
| 40 | Sx | PR | 650-1200 | 150 | 1 | 150 | 0 | 96 | 1 | | | | | | | | | | | 3776 | 2 | 3776 | 1 | 3776 | 1 | | | 7.0 |
| 41 | Fdi | PG | 700-1200 | | | | | | | | | 7 | 5 | 460 | 1 | | | | | 1265 | 1 | | | | | | | 7.5 |
| 42 | Sx | PG | 1200-1550 | | | | | | | | | | | | | | | | | 1017 | 1 | | | | | | | 1.3 |
| 43 | Fdi | CT | 600-1400 | | | | | | | | | 3 | 2 | 450 | 1 | | | | | 962 | 1 | | | | | | | 4.1 |
| 44 | Sx | NE | 1-1000 | | | | | | | | | 2 | 1 | | | 225 | 1 | | | 900 | 4 | 900 | 0 | 900 | 1 | | | 6.1 |
| 45 | Pli | BB/CHL | all | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 46 | Bl | all int. | all | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 47 | Bn | M | all | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 48 | At/Ep/Ct | interior | all | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 49 | Dr/Ct/Mb | Coast | all | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| 50 | Lw | NE | 1200-1800 | | | | | | | | | | | | | | | | | | | | | | | | | 0.0 |
| | | | Totals | 4571 | 46 | 8799 | 19 | 3948 | 46 | 2896 | 63 | 63200 | 92 | 6279 | 16 | 26936 | 54 | 16440 | 11 | 162327 | 254 | 51137 | 18 | 128874 | 64 | 11 | 81 | 762.9 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | Risk managed | | 0 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | Total | | $ 762.9 |

Spending for 2011/12 is projected at $1,015,000, of which $454,000 will be supported through LBIS funds allocated in 2011/12, $451,000 from seed sales, and the remaining $110,000 from cash reserves and return on investments. Seed production forecasts are based on long-term production curves for similar orchards, but annual production can vary widely.

**Table 4** **SelectSeed Company Ltd. 2011/12 budget by category**

| Category | Total projected expenses / income |
|---|---|
| **Expenses** | |
| Orchard management costs | 567,000 |
| Propagation and holding | 13,000 |
| SelectSeed management and FGC support | 256,600 |
| NSERC Industrial Chair support | 55,000 |
| Crop production / seed extraction | 123,400 |
| Total Expenditures | $1,015,000 |
| **Income** | |
| Seed sales | 451,000 |
| Interest from investments | 10,000 |
| Total Income | $461,000 |
| Carry-over cash from prev. year | $100,000 |
| **Total MYA support** | **$454,000** |

**Table 5** **Orchards under contract to SelectSeed Company Ltd.**

| *Seed planning unit* | | | | |
|---|---|---|---|---|
| **SPU#** | **Species** | **Seed zone** | **Planned # ramets** | **Location** |
| 21 | Fdi | NE low | 2187 | Armstrong - Grandview |
| 37 | Fdi | QL | 776 | Vernon |
| 41 | Fdi | PG | 786 | Vernon |
| 28 | Sx | TO high | 1056 | Armstrong - Eaglerock |
| 30 | Sx | TO low | 454 | Armstrong - Eaglerock |
| 7 | Pli | NE low | 1000 | Armstrong - Grandview |
| 10 | Pli | TO low | 4796 | Armstrong - Grandview |
| 12 | Pli | PG low | 4884 | Kettle Valley |
| 12 | Pli | PG low | 4500 | Vernon |
| 16 | Pli | TO high | 3508 | Armstrong - Eaglerock |
| 17 | Pli | BV low | 3000 | Vernon |
| 17 | Pli | BV low | 3100 | Sorrento |
| 18 | Pli | CP low | 2000 | Sorrento |
| 18 | Pli | CP low | 3100 | Kettle Valley |
| | | TOTAL | 35,147 | |

## 3.5 Extension and Communication

The Extension and Communication Subprogram supports FGC goals and objectives through:

- extension (providing client-focused solutions and training to seed users and tree improvement specialists),
- communication (developing and disseminating information on the program and its activities to all FGC target audiences),
- training.

### 3.5.1 Planning

Extension and communication activities are developed and guided by the FGC Extension Technical Advisory Committee (ETAC). ETAC includes representatives from the FLNR, forest licensees, and the private consulting community.

The ETAC extension and communication strategy is based on three broad goals:

1. To work closely with Council and its TACs to coordinate and manage extension efforts in support of Council's provincial genetic resource management program.
2. To provide information and policy advice to Council on issues related to extension
3. To act as a forum for user feedback.

### 3.5.2 Management

ETAC identifies goals and audiences for extension, communication and education activities, and with the assistance of an Extension Coordinator from the FLNR – Tree Improvement Branch, develops a business plan. The Coordinator is responsible for the management of ETAC activities, and the coordination of ETAC work in conjunction with Council and other committees of Council. Projects are undertaken through contracts or through direct delivery by cooperators. Budget development for LBIS funds is first done by the ETAC, with final approval by the FGC. Project spending is approved by the ETAC Chair and the FGC Program Manager, and must meet administrative guidelines set out for LBIS funds. ETAC reports to Council on activities, progress, and spending at mid-year and year end.

### 3.5.3 Activities and Budget

The extension and communication budget for 2011/12 is $20,000. In-kind, staff time and other contributions by affiliated agencies and companies are incremental to this amount and are not listed. Projects and budgets are summarized in Table 6.

**Table 6 Extension and communication projects and budgets for 2011/12**

| Project | Budget ($) |
|---|---|
| Client survey of extension needs | 3,000 |
| Workshops (to be determined from the following topics): | 9,000 |
| Nutrient analysis for seed orchards | |
| Cone collection methods for non-orchard forestry staff | |
| Seed and seedling workshop | |
| Seed orchard pest management workshop | |
| Extension meeting and presentation | |
| Support for other groups with topics relevant to FGC needs | |
| Whitebark Pine Ecosystem Foundation meeting Lillooett | 1,000 |
| Publications (TIC*talk*, Extension Notes, generic presentation for use at educational events and with new employees | 3,500 |
| Administration, opportunities, travel | 3,500 |
| **Total** | **$20,000** |

## 3.6 Genetic Resource Decision Support Subprogram

The Genetic Resource Decision Support Subprogram (GRDS) supports FGC goals and objectives through the development of genetic information management systems. These systems assist clients in decision making, seed policy and planning, seed use (registration, storage, selection & use, and transfer), timber supply analysis, effectiveness evaluation and monitoring and other GRM activities.

### 3.6.1 Planning

GRDS projects are developed and guided by the Genetic Resource Decision Support steering committee comprised of ministry, industry and academic representatives.

### 3.6.2 Management

The GRDS Steering Committee identifies short- and long-term goals that support clients GRM information needs. Significant project changes or re-allocations of funds from the approved Business Plan require approval of the Steering Committee and the FGC Program Manager on behalf of the FGC.

### 3.6.3 Activities and Budget

Priorities for the 2011/12 fiscal year relate to the production of information in support of the collection of cones and seed needed for significant reforestation efforts related to the mountain pine beetle epidemic and to large fires in central BC. Climate-based seed transfer policy development and associated information systems for operational use are also a priority. A total of $60,000 is allocated to these projects.

## 3.7 Cone and Seed Pest Management Subprogram

The Pest Management Subprogram supports FGC objectives by reducing orchard seed losses to insect and disease pests through research, technical support, and the development of integrated pest management strategies in conjunction with orchard managers and pest management research and extension specialists.

### 3.7.1 Planning

The Subprogram is guided by a Pest Management Technical Advisory Committee (PMTAC), with membership from industry, the FLNR, the Canadian Forest Service, and universities. Issues are identified and ranked by the PMTAC based on perceived impact on seed losses, and the effect of these seed losses on FGC objectives. The TAC also makes recommendations to Council regarding subprogram organization, management, and budgets.

### 3.7.2 Management

With direction from the PMTAC, research proposals were developed by the pest management scientist and pest management specialists supported through the subprogram. These were subsequently reviewed by Pest Management TAC members, and recommendations made for project modifications and acceptance.

The FLNR Tree Improvement Branch manages budgets and the financial administration of projects recommended by the PMTAC and approved by the FGC. Significant priorities and changes during the fiscal year are made in consultation with the TAC and the FGC Program Manager.

### 3.7.3 Activities and budget

The total Pest Management subprogram budget for 2011/12 is $130,000. In-kind, staff time and other contributions by affiliated companies and agencies are incremental to this amount. Projects and budgets are summarized in Table 7.

**Table 7 Cone and Seed Pest Management Subprogram projects for 2011/12.**

| Project | Species impacted | Budget ($) | Products |
|---|---|---|---|
| Operational support for FLNR cone & seed pest biologist | All species | $ 26,325 | Progress report |
| Operational support for FLNR cone & Seed pest research laboratory | Sx, Fdi, Fdc, Lw, Pw | $ 26,775 | Progress report |
| Pesticide trials to identify new pesticides and to develop data for their registration for use on cone and seed pests | Fdi, Sx | $ 29,400 | Progress report |
| Contarinia/Leptoglossus visual foraging Cues project | All except Cwr & Yc | $ 47,500 | Progress report |
| **Total budget** | | **130,000** | |

## 3.8 Genecology and Seed Transfer Subprogram

The purpose of the Genecology and Seed Transfer Subprogram is to effectively direct funding to priority genecology and seed transfer projects in support of FGC strategic objectives and provincial seed transfer policy development.

### 3.8.1 Planning

The subprogram is guided by the Seed Transfer TAC (STTAC), with representation from FLNR, industry, and university stakeholders. Priorities for genecology and seed transfer information needs are set within the context of other work currently underway, such as in the Breeding Subprogram, existing genecology trials, and seed transfer policy needs. The STTAC reviews priorities and projects set out by FLNR Tree Improvement Branch (TIB) scientists, leads the development of a call for proposals for non-FLNR projects, and makes recommendations to the FGC regarding budgets, priorities, and delivery process.

### 3.8.2 Management

The STTAC developed a list of priorities for genecology and seed transfer projects by species and type of work. Based on these priorities, a business plan was compiled by TIB scientists and reviewed by the STTAC. In addition, a call for proposals was released by the TIB on behalf of the STTAC and proposals were screened by a review committee of the STTAC. Funding recommendations were made to the FGC

The FLNR Tree Improvement Branch manages financial administration for approved projects through either direct spending within the Branch or through contracts with successful project proponents. Project financial and progress reporting is managed through the TIB, and incorporated in annual FGC reports.

### 3.8.3 Activities and budget

The total budget allocated to the Genecology and Seed Transfer Subprogram for 2011/12 is $620,000. This amount falls into three primary categories:

1. Proposals that were successful in a call for proposals open only to proponents outside the FLNR, totaling $99,796 (Table 8).
2. Projects led by scientists from the FLNR TIB totaling $287,200 (Table 9),
3. Assisted Migration Adaptation Trial investment led by the FLNR TIB and totaling $233,000 (Table 9),

**Table 8 Genecology and Seed Transfer Subprogram projects led by non-FLNR proponents and approved through a call for proposals.**

| Species | Project Title | Budget | Performance indicator |
|---|---|---|---|
| Sx, Pli | Assessing the adaptive portfolio of reforestation stocks for future climates: Common garden experiments | $34,812 | 1 report |
| All | Development of a climate-based seed transfer system for changing climates | $44,076 | 1 report |
| Cwr;Lw | Climatic response of western redcedar and western larch seed sources using controlled climate chambers. | $10,908 | 1 report |
| Fdi | Using dendroecology of Interior Douglas-fir to quantify critical seed transfer distance | $10,000 | 1 report |
| **Total** | | **$99,796** | |

**Table 9 FLNR Tree Improvement Branch Genecology and Seed Transfer Subprogram projects, recommended funding, and performance indicators (KPI).**

| Species | Genecology research priority | 251 Seed procurement: # sources | | 252 Seedling production: # seedlings x 000 | | 253 Trial establishment: # test sites | | 254 Trial maintenance: # test sites | | 255 Trial measurement: # test sites | | 256 Trial Assessment: # test sites | | 257 Analysis of trials: # trials | | Species total ($ x 1000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | KPI | $ | |
| Pli | High | 250 | 15 | | | | | | | | | | | | | 15.0 |
| Fdi | High | | | | | | | 9 | 35.0 | 6 | 30.0 | | | | | 65.0 |
| Cw c | High | | | 20 | 10.0 | | | 6 | 7.5 | 6 | 7.5 | 6 | 3.0 | | | 28.0 |
| Fdc | High | | | | | | | | | | | | | | | 0.0 |
| Sx | High | | | | | | | 18 | 15.0 | | | 6 | 4.0 | 16 | 6.0 | 25.0 |
| Hw | High | | | | | | | 12 | 18.0 | 2 | 4.0 | | | 2 | 0.5 | 22.5 |
| Bl | Medium | | | | | | | 8 | 18.0 | 2 | 2.5 | | | | | 20.5 |
| Lw | Medium | | | | | | | | | | | | | | | 0.0 |
| Cw i | Medium | | | | | | | 8 | 14.5 | | | 8 | 3.5 | | | 18.0 |
| Ba | Medium | | | | | | | 4 | 9.0 | 5 | 12.5 | | | | | 21.5 |
| Pw | Medium | | | | | | | | | | | 8 | 10.0 | | | 10.0 |
| Yc | Medium | | | | | | | 5 | 6.5 | 5 | 8.5 | | | | | 15.0 |
| Ss | Low | | | | | | | 4 | 4.0 | 6 | 6.0 | 6 | 2.0 | | | 12.0 |
| Dr | Low | 40 | 5.0 | | | | | 3 | 5.0 | | | | | | | 10.0 |
| Ep | Low | | | | | | | | | | | | | | | 0.0 |
| Bg | Low | | | | | | | | | 4 | 4.0 | | | | | 4.0 |
| At | Low | | | | | | | | | | | | | | | 0.0 |
| Act | Low | | | 4 | 5.0 | 1 | 5 | | | | | | | | | 10.0 |
| Py | Low | | | | | | | | | | | | | | | 0.0 |
| Mb | Low | | | | | | | 4 | 10.0 | | | | | | | 10.0 |
| Bn | Low | | | | | | | 5 | 8 | | | | | | | 8.0 |
| Risk managed | | | | | | | | | | | | | | | | -7.3 |
| AMAT* | | | | 52 | 28 | 12 | 182 | 24 | 10 | 24 | 9 | | 4 | | | 233.0 |
| Totals | | 290 | 20 | 76 | 43 | 13 | 187 | 110 | 161 | 60 | 84 | 34 | 27 | 18 | 7 | 520.2 |

* Assisted Migration Adaptation Trial; includes multiple species.

## 3.9 Administration

Administration of the LBIS Tree Improvement Program is provided by the Tree Improvement Branch of the FLNR. There are three components to this work:

- the administration of LBIS funds allocated to subprograms managed by the FLNR, including Tree Breeding, OTIP, Genecology and Seed Transfer, Extension and Communication, Pest Management, and Genetic Resource Information Management,
- the administration of contracts with successful proponents through the OTIP, Genecology and Seed Transfer proposal calls, and with universities and SelectSeed Company Ltd.,
- support for the business of the FGC, including scheduling meetings, assistance with information distribution, and dealing with queries and planning.

### 3.9.1 Costs

FLNR administration costs are reviewed by the FGC, and a recommendation is made for support under LBIS. The administration budget is approved by the FGC in conjunction with other LBIS Tree Improvement Program budget items.

### 3.9.2 Management

Overall program management is carried out on behalf of the Forest Genetics Council by the FGC Program Manager working for SelectSeed Company Ltd. This work includes planning, coordination of committees, Business Plan development, reporting, correspondence, and representing the FGC in daily business. The FLNR Tree Improvement Branch provides administrative support, overall financial management, and assistance with the coordination of FGC business.

### 3.9.3 Activities and Budget

The 2011/12 budget for the Administration Subprogram is $30,000. This amount includes all program administration costs incurred by the FLNR Tree Improvement Branch.

## 3.10 Applied Tree Improvement and Biotechnology

The Applied Tree Improvement and Biotechnology research program carried out at the University of British Columbia received funds through the LBIS Tree Improvement Program. A steering committee provided review of ongoing research proposed through this project and advice on implementation. The total funding allocation for 2011/12 is $137,000. Projects include estimating parental gametic contributions in western larch and Douglas-fir seed orchards seed orchards, estimating of non-orchard pollen contamination levels in coastal Douglas-fir, and better understanding pollination dynamics in redcedar orchards.

## 3.11 Budget Summary

A Land Base Investment Strategy Tree Improvement Program budget allocation of $3.5 million is approved for the 2011/12 fiscal year, and is summarized in Table 10.

**Table 10 2011/12 budget summary for LBIS Tree Improvement Program contributions to subprograms.**

| Subprogram | Allocation ($ x 1000) |
|---|---|
| Genetic Conservation | 205 |
| Tree Breeding | 1,156 |
| Operational Tree Improvement Program (OTIP) | 765 |
| Extension and Communication | 20 |
| Genetic Resource Information Management | 60 |
| Cone and Seed Pest Management | 130 |
| Expansion of Orchard Seed Supply (SelectSeed Ltd.) | 440 |
| Genecology and Seed Transfer | 620 |
| Applied Tree Improvement and biotechnology (UBC) | 137 |
| Administration (Tree Improvement Branch) | 30 |
| Risk managed | -63 |
| **Total** | **3,500** |

# 4.0 Funding and Administrative Mechanisms

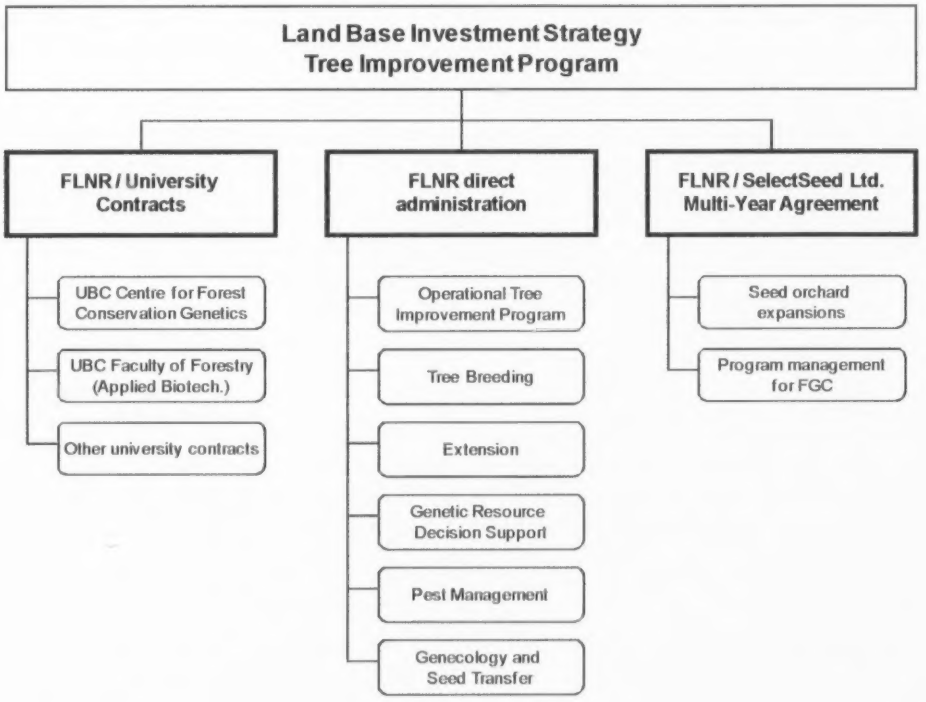
## 4.1 Funding Agreements

The Land Base Investment Strategy Tree Improvement program is administered by the Tree Improvement Branch of the FLNR. FGC Business Plan activities are supported through the following administrative mechanisms:

- FLNR/SelectSeed Co. Ltd. Multi-Year Agreement
- FLNR contracts
- FLNR/University contracts
- FLNR direct management and administration

The subprograms associated with each of the mechanisms are shown in Figure 4. Resources from other agencies include in-kind facilities, staff and direct funds. Seed sales from orchards also provide revenue to support seed production. Only Land Base Investment Program funding is detailed in this Business Plan.

**Figure 4** **Administrative mechanisms for the delivery of the LBIS Tree Improvement Program funding.**



## 4.2 Monitoring and Reporting

Monitoring progress is an important objective of the FGC program. All LBIS funded activities report on performance relative to criteria. In addition, progress towards long-term objectives is measured at the provincial level for all FGC activities.

### 4.2.1 Project-Level Reporting

Projects from each subprogram provide reports to be published in the annual Tree Improvement Program Projects Report for 2011/12. Work quality will be periodically audited through Review Committees and site visits. Reports will be received and reviewed by Technical Advisory Committees or project steering committees, as appropriate, as well as by the FLNR Program Administrator and the FGC Program Manager. Quarterly reporting to the FLNR Program Administrator on spending and progress is required for all OTIP projects and for SelectSeed Ltd.

### 4.2.2 Provincial-Level Reporting

Progress towards FGC provincial objectives (see section 1.1) for increasing genetic worth of seedlots used, increasing the use of orchard seed, and climate-based seed transfer will be reported using provincial summaries of performance indicators. SelectSeed Company Ltd. will produce an annual report showing performance indicators, financial statements, and audit reports. Reporting requirements are identified in Table 11.

**Table 11 List of reports, responsibilities, distribution, and preparation dates for LBIS-supported projects.**

| Type of report | Prepared by | Prepared for | Distribution | Dates due |
|---|---|---|---|---|
| Interim project status | Project leader | FLNR program administrators for early FY reallocations | On request | Aug 1 |
| Project level | Project proponent | FLNR Program Administrator | On request | Oct 30<br>April 30 |
| Annual reports and progress summary | FGC Program Manager, Program Administrator FLNR; project leader contributions | FGC; FLNR Chief Forester; TACs; general distribution | FGC members; TACs; FIA administrators; FLNR; general distribution; FGC website | April 30 |

* The Interim Project Status report is an informal report intended only to identify projects that are not progressing as planned, and for which funds may be re-allocated.

# Appendix 1: Seed Planning Units and Categories

The following table lists seed planning units (SPU) and activity categories. All provincial SPUs are grouped to one of the four categories shown below using a protocol developed by the FGC Strategic Planning Committee. The protocol evaluates SPUs based on the net present value of tree improvement investments, feasibility criteria, uncertainty, opportunities, and seed transfer information needs. Listed SPUs have a Species Plan in Appendix 3, and only include SPUs falling into categories 1 to 3. Annual planting is the 5-year mean of 2007–2011 seedling requests to SPAR. Categorization for SPUs # 6, 8 and 15, are based on an expectation of increased planting with pest resistant material.

Program categories include;

1. Advanced-generation program,
2. First-generation program,
3. Genecology research only, and
4. No genetics program.

| Seed planning unit (SPU) | | | | Program |
|---|---|---|---|---|
| # | Species | SPZ | Elev. band (m) | category |
| 1 | Fdc | M | 1-900 | 1 |
| 2 | Cw | M | 1-700 | 1 |
| 3 | Hw | M | 1-600 | 2 |
| 4 | Sx | NE | 1000-1700 | 1 |
| 5 | Sx | NE | 1700-2100 | 2 |
| 6 | Ss | M | 1-500 | 2 |
| 7 | Pli | NE | 700-1600 | 1 |
| 8 | Pw | M/SM | 1-1000 | 1 |
| 9 | Ba | M | 1-1000 | 3 |
| 10 | Pli | TO | 700-1400 | 1 |
| 11 | Yc | M | 1-1100 | 2 |
| 12 | Pli | PG | 700-1400 | 1 |
| 13 | Lw | NE | 700-1600 | 1 |
| 14 | Sx | PG | 600-1400 | 1 |
| 15 | Pw | KQ | 500-1400 | 1 |
| 16 | Pli | TO | 1400-1600 | 2 |
| 17 | Pli | BV | 700-1400 | 1 |
| 18 | Pli | CP | 700-1300 | 1 |
| 19 | Fdc | SM | 200-1000 | 2 |
| 20 | Pli | NE | 1600-2000 | 2 |
| 21 | Fdi | NE | 400-1200 | 1 |
| 22 | Fdi | NE | 1000-1800 | 2 |
| 23 | Sx/Ss | SM/NST | all | 2 |
| 24 | Hw | M | 600-1100 | 2 |
| 25 | Sx | EK | 750-1900 | 2 |
| 26 | Pli | PG | 1400-2000 | 3 |

| Seed planning unit (SPU) | | | | Program |
|---|---|---|---|---|
| # | Species | SPZ | Elev. Band (m) | category |
| 27 | Cw | SM | 200-1000 | 2 |
| 28 | Sx | TO | 1300-2100 | 2 |
| 29 | Pli | EK | 1500-2000 | 2 |
| 30 | Sx | TO | 700-1500 | 1 |
| 31 | Fdc | M | 900-1200 | 2 |
| 32 | Pli | EK | 800-1500 | 2 |
| 33 | Cw | M | 700-1500 | 2 |
| 34 | Lw | EK | 800-1700 | 1 |
| 35 | Sx | BV | 500-1400 | 2 |
| 36 | Bg | M | 1-700 | 3 |
| 37 | Fdi | QL | 700-1400 | 2 |
| 38 | Hw | M north | 1-600 (part of SPU 3) | |
| 39 | Fdi | EK | 700-1400 | 2 |
| 40L | Sx | PR low | <650 | 2 |
| 40 | Sx | PR mid | 650-1200 | 2 |
| 41 | Fdi | PG | 700-1200 | 2 |
| 42 | Sx | PG | 1200-1550 | 2 |
| 43 | Fdi | CT | 600-1400 | 2 |
| 44 | Sx | NE | 1-1000 | 1 |
| 45 | Pli | BB/CHL | All | 3 |
| 46 | Bl | all int. | all | 3 |
| 47 | Bn | M | all | 3 |
| 48 | Broadleaves | Interior | - | 3 |
| 49 | Broadleaves | Coast | - | 3 |
| 50 | Lw | NE | 1200-1800 | 2 |
| 51 | Py | S. Interior | 300-1200 | 2 |

**Note regarding seed zone changes**

Seed zones are adjusted from time to time based on new research information, or on administrative needs. For information updates on seed zones, please contact Lee Charleson of the Ministry of Forests and Range Tree Improvement Branch (lee.charleson@gov.bc.ca)

# Appendix 2: Forest Genetics Council and Technical Advisory Committee Members

## Forest Genetics Council of BC

| Name | Affiliation | Representing |
|---|---|---|
| Brian Barber (Co-Chair) | FLNR Tree Improvement. Branch | FLNR Co-Chair |
| Kerry McGourlick (Co-Chair) | Western Forest Products Inc. | Industry Co-Chair |
| Raoul Wiart | Canadian Forest Service | Canadian Forest Service |
| Dr. Rob Guy | University of BC | Universities |
| Scott King | Lousiana Pacific | Southern interior industry |
| Joe Leblanc | Interfor Ltd. | Coast industry |
| Tim Lee | Vernon Seed Orchard Co. | Interior Technical Advisory Committee |
| Al McDonald | BC Timber Sales | BC Timber Sales Ltd. |
| Larry Gardner | West Fraser Timber Ltd. | Interior industry orchard owners |
| Vacant | FLNR, Operations | FLNR |
| John Mitchell | TimberWest Forests ltd. | Coast industry orchard owners |
| Barrie Phillips | FLNR Tree Improvement. Branch | FLNR |
| Annette van Niejenhuis | Western Forest Products Inc. | Coastal Technical Advisory Committee |
| Gernot Zemanek | Roserim Forest Nursery | Woodlots and nurseries |

## Genetic Conservation Technical Advisory Committee

| Name | Affiliation | Name | Affiliation |
|---|---|---|---|
| Dave Kolotelo (Chair) | FLNR Tree Imp. Branch | Jodie Krakowski | FLNR Tree Imp. Branch |
| Dr. Sally Aitken | University of BC | Dr. Michael Murray | FLNR SI Region |
| Charlie Cartwright | FLNR Tree Imp. Branch | Tory Stevens | Ministry of Environment |
| Lee Charleson | FLNR Tree Imp. Branch | Dr. Tongli Wang | University of BC |
| Dr. Scott Green | University of Northern BC | Jack Woods | SelectSeed Ltd. / FGC |
| Dr. Andreas Hamann | University of Alberta | Dr. Alvin Yanchuk | FLNR Tree Imp. Branch |

## Coastal Technical Advisory Committee

| Name | Affiliation | Name | Affiliation |
|---|---|---|---|
| Annette van Niejenhuis (Chair) | Western Forest Products Inc. | Siroil Paquet | Sylvan Vale Nurseries Ltd. |
| Dr. Sally Aitken | University of BC | David Reid | FLNR Tree Imp. Branch |
| Charlie Cartwright | FLNR Tree Imp. Branch | Dr. John Russell | FLNR Tree Imp. Branch |
| Tim Crowder | TimberWest Forests | Brian Saunders | Island Timber Ltd. |
| Diane Douglas | FLNR Tree Imp. Branch | Dr. Michael Stoehr | FLNR Tree Imp. Branch |
| Dr. John King | FLNR Tree Imp. Branch | Dr. Joe Webber | ProSeed Consulting |
| Dave Kolotelo | FLNR Tree Imp. Branch | Dr. Chang-yi Xie | FLNR Tree Imp. Branch |
| Bob Merrell | BC Timber Sales Ltd. | Dr. Alvin Yanchuk | FLNR Tree Imp. Branch |

## Interior Technical Advisory Committee

| Name | Affiliation | Name | Affiliation |
|---|---|---|---|
| Tim Lee (Chair) | Vernon Seed Orchard Co. | Mike Madill | FLNR, SI Region |
| Dr. Michael Carlson | FLNR, Research Branch | Anna Monetta | FLNR, NI Region |
| Krista Copeland | Tolko Ltd. | Wayne Nuyens | West Fraser Timber Ltd. |
| Vince Day | Canadian Forest Products Ltd. | Greg O'Neill | FLNR Tree Imp. Branch |
| Diane Douglas | FLNR Tree Imp. Branch | Roger Painter | SelectSeed Ltd. |
| Dan Gaudet | Vernon Seed Orchard Company | Doug Perdue | Dunkley Lumber |
| Hilary Graham | Pacific Regeneration Technologies | David Reid | FLNR Tree Imp. Branch |
| Barry Jaquish | FLNR Tree Imp. Branch | Chris Walsh | FLNR Tree Imp. Branch |
| Dave Kolotelo | FLNR Tree Imp. Branch | | |

## Extension Technical Advisory Committee

| Name | Affiliation | Name | Affiliation |
|---|---|---|---|
| Diane Douglas (Chair) | FLNR Tree Imp. Branch | Tim Lee | Vernon Seed Orchard Company Ltd. |
| Dr. Michael Carlson | FLNR Tree Imp. Branch | Roger Painter | SelectSeed Ltd. |
| Charlie Cartwright | FLNR Tree Imp. Branch | Debbie Poldrugovac | FLNR Tree Imp. Branch |
| Keith Cox | Retired from FLNR TIB | Kathie Swift | FORREX |
| Tim Crowder | TimberWest Ltd. | Dave Trotter | Min. of Agriculture and Lands |
| Peter Forsythe | Huckleberry Forestry Ltd. | Nick Ukrainetz | FLNR Tree Imp. Branch |
| Lauchlan Glen | BC Timber Sales Ltd. | Tia Wagner | Tolko Ltd. |
| Hilary Graham | Pacific Regeneration Technology | Jack Woods | SelectSeed Ltd. / FGC |

## Pest Management Technical Advisory Committee

| Name | Affiliation | Name | Affiliation |
|---|---|---|---|
| Jim Corrigan (Chair) | FLNR, Tree Imp. Branch | Dr. Michael Stoehr | FLNR Tree Imp. Branch |
| Tim Crowder | TimberWest Forests Ltd. | Dr. Jean Turgeon | Canadian Forest Service |
| Dan Gaudet | Vernon Seed Orchard Company | Chris Walsh | FLNR, Tree Imp. Branch |
| Hilary Graham | Pacific Regen. Technologies Ltd. | Jack Woods | SelectSeed Ltd. / FGC |

## Decision Support Advisory Committee

| Name | Affiliation | Name | Affiliation |
|---|---|---|---|
| Guy Burdikin (Chair) | West Fraser Timber Ltd. | Matt Leroy | FLNR Tree Imp. Branch |
| Lee Charleson | FLNR Tree Imp. Branch | Michael Postma | FLNR Tree Imp. Branch |
| Cathy Cook | Western Forest Products Inc. | Chris Runnals | FLNR SI Region |
| Vince Day | Canadian Forest Products Ltd. | Jack Woods | SelectSeed Ltd. / FGC |
| Dan Gaudet | Vernon Seed Orchard Company | Susan Zedel | FLNR Tree Imp. Branch |

## Seed Transfer Technical Advisory Committee

| Name | Affiliation | Name | Affiliation |
|---|---|---|---|
| Lee Charleson (Chair) | FLNR Tree Imp. Branch | Dr. Greg O'Neill | FLNR Tree Imp. Branch |
| Dr. Sally Aitken | University of BC | Dr. John Russell | FLNR Tree Imp. Branch |
| Guy Burdikin | West Fraser Timber Ltd. | Nick Ukrainetz | FLNR Tree Imp. Branch |
| Diane Douglas | FLNR Tree Imp. Branch | Annette vanNiejenhuis | Western Forest Products Inc. |
| Scott King | Louisiana Pacific Ltd. | Craig Wickland | FLNR Coast Region |
| Leslie McAuley | FLNR Tree Imp. Branch | Jack Woods | SelectSeed Ltd. / FGC |

# Appendix 3: Species Plans

Species plans present information for seed planning units with active or planned breeding programs, seed orchards, or genecology work, including SPUs that are not supported through LBIS Tree Improvement Program funding. Information presented includes breeding strategy (where applicable), seed orchard production forecasts, gain forecasts, historic seed use, seed in storage, genetic conservation status, and genecology/seed transfer projects. The plans are organized by species.

The species plans can be viewed at: http://www.for.gov.bc.ca/hti/speciesplan/index.htm